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EXAMINER	
SMITH, NICHOLAS A	
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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/724,248
Filing Date: November 28, 2003
Appellant(s): PHILLIPS ET AL.

Francis C. Hand
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 21 March 2007 appealing from the Office action mailed 26 October 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,537,489	ALLROTH ET AL.	3-2003
6,235,076	OZAKI ET AL.	5-2001

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allroth et al. in view of Ozaki et al.

Allroth et al. discloses the invention substantially as claimed. Allroth et al. discloses a process comprising:

mixing a ferrous metal powder with a lubricant to form a mixture;

compacting the mixture at high pressure by HVVC.; and

heating the compacted mixture at a temperature of up to 2552°F to liquid phase sinter the compact to form a sintered metal body (col. 4, lines 57-60).

Allroth et al. further discloses wherein the lubricant is liquid during the compacting step (col. 5, lines17-20).

Allroth et al. further discloses wherein the lubricant includes graphite. Allroth et al. further discloses wherein the mixture further includes other metal powders including Ni (col. 2, line 42) which meets the limitation of claim 4.

However, Allroth et al. does not disclose lauric acid as a member of the lubricant, but discloses that conventional lubricants can be used in the invention (col. 2, line 64).

Ozaki et al. teaches that the lubricant can include lauric acid (col. 5, lines 3-4) in the same field of invention for the purpose improving the flowability of the mixture.

It would have been obvious to one having ordinary skill in the art to use the lubricant of Ozaki et al. which includes lauric acid in the invention of Allroth et al. in order to improve the flowability of the mixture.

Allroth et al. discloses processing parameters of pressure and that significantly overlap those as claimed by Applicant, establishing a prima facie case of obviousness (see MPEP 2144.05).

Allroth et al. states that his invention produces products of greater than 99% density (col. 4, lines 52-56 in light of lines 46-33).

(10) Response to Argument

Appellant argues:

Prior art (Allroth et al. and Ozaki et al.) do not disclose a liquid phase former included in the powder mixture.

Allroth et al. does not disclose positively that graphite is used to effect as a liquid phase former in liquid phase sintering.

The instant application describes a characteristic of liquid phase former during sintering wherein the surface and surface composition of the metal particle and the liquid phase former form a surface composition that upon further heating will liquefy forming a liquid film and provides surface tension which aids the densification process; such a result is not taught in Allroth.

Allroth et al. and Ozaki et al. do not teach the claimed compaction pressure.

Examiner replies:

While the term "liquid phase former" is not specifically disclosed in Allroth et al., additives and alloying elements such as graphite, phosphorous and nickel are disclosed (col. 2, lines 41-45, 60-64). In the instant specification and instant claims, these

constituents are disclosed as "liquid phase formers" (claim 4 and specification, p. 3, lines 4-8).

Since prior art discloses same materials used in the process (lubricant, liquid phase former, as demonstrated above, metal particles), same process steps (mixing, compaction/compression, and sintering) with same processing conditions (temperature – note that Allroth et al. discloses 1400°C (2552°F) at col. 4, lines 57-60, which is substantially the same temperature disclosed in instant specification, pp. 7-9; etc.), one of ordinary skill in the art would expect the same effect to occur, that being "to effect a liquid phase sintering of said liquid phase former with said particles of metal powder." Furthermore, since substantially the same process conditions and starting materials are used, the prior art process would inherently have a characteristic of liquid phase former during sintering wherein the surface and surface composition of the metal particle and the liquid phase former form a surface composition that upon further heating will liquefy forming a liquid film and provides surface tension which aids the densification process.

Allroth et al. teaches compression of a mixture is at a pressure sufficient to liquefy and uniformly distribute the lubricant with the compressed mixture (col. 5, lines 17-25). While Allroth et al. does not specifically teach this process in regards to effecting a uniform distribution of liquid phase former on particles of metal powder, one of ordinary skill in the art would realize that such a description of the compression process would naturally include embodiments where liquid phase formers (see explanation liquid phase formers above) are included in the mixture in the compression step. A uniform distribution of liquid phase formers (nickel, phosphorous, graphite, etc.)

is a common function of lubricants, as lubricants are used to prevent segregation in powder mixtures (Ozaki et al., col. 4, lines 42-44).

Allroth et al. teaches that while there is no straight equivalence exists between ram speed and conventional compaction pressure, one of ordinary skill in the art can through routine experimentation determine the proper compaction or compression conditions and thus these processing conditions are optimizable (Allroth, col. 3, lines 46-67). See MPEP 2144.05. It would have been obvious to one of ordinary skill in the art to select the claimed compaction pressures because Allroth et al. teaches such conditions can be determined experimentally by one of ordinary skill in the art (Allroth et al., col. 3, lines 46-67).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Nicholas A. Smith

Patent Examiner

Art Unit 1753

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